

What is Claimed:

1. An apparatus for sealing a puncture extending through tissue, comprising:

a tubular member having a proximal end, a distal end sized 5 for insertion into the puncture, and a lumen extending between the proximal and distal ends;

an elongate occlusion member slidably disposed within the tubular member, the occlusion member comprising a proximal end, and a distal end extending distally through an opening in the 10 distal end of the tubular member;

an expandable member on the occlusion member distal end;

a delivery device coupled to the proximal end of the tubular member, the delivery device comprising a plunger that is advanceable to deliver a sealing compound into the tubular member 15 lumen; and

a retraction assembly coupled to the proximal end of the tubular member and to the occlusion member, the retraction assembly comprising a lock for securing the tubular member in a distal position relative to the occlusion member, and a trigger 20 that is activated by advancement of the plunger to thereby disengage the lock, the retraction assembly being biased to retract the tubular member proximally relative to the occlusion member when the lock is disengaged.

2. The apparatus of claim 1, the occlusion member further comprising:

an outer member comprising proximal and distal ends defining  
5 a longitudinal axis therebetween with an inflation lumen  
extending between the outer member proximal and distal ends, the  
expandable member comprising proximal and distal ends and having  
a variable length dimension, the proximal end of the expandable  
member being coupled to the distal end of the outer member such  
10 that an interior of the expandable member is in fluid  
communication with the inflation lumen, the expandable member  
being expandable from a collapsed state to an expanded state by  
introduction of fluid into the interior; and  
an inner member slidably coupled to the outer member and  
15 comprising proximal and distal ends, the inner member distal end  
coupled to the expandable member distal end, the inner member  
slidably relative to the outer member for moving the distal end  
of the expandable member towards and away from the proximal end  
of the expandable member when the expandable member is expanded  
20 and collapsed, respectively.

3. The apparatus of claim 2, further comprising a housing  
on the proximal end of the outer member, the housing comprising a

chamber in fluid communication with the inflation lumen, a piston slidably disposed within the chamber and coupled to the inner member, a reservoir filled with inflation media and in fluid communication with the chamber, and an actuator that may be  
5 activated by a user to direct the inflation media from the reservoir into the chamber and inflation lumen, thereby substantially simultaneously expanding the expandable member and directing the piston proximally to thereby pull the inner member proximally to shorten the expandable member as it expands.

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4. The apparatus of claim 3, wherein the actuator may be deactivated to withdraw inflation media from the chamber and the inflation lumen into the reservoir, thereby substantially simultaneously collapsing the expandable member and directing the  
15 piston distally to push the inner member distally to lengthen the expandable member as it collapses.

5. The apparatus of claim 3, wherein the proximal and distal ends of the expandable member at least partially evert  
20 into the interior of the expandable member as the expandable member expands.

6. The apparatus of claim 1, the retraction assembly further comprising an elongate member extending distally along a proximal portion of the occlusion member, the elongate member comprising one or more connectors on a distal end thereof, the  
5 one or more connectors connectable to the proximal end of the tubular member to thereby couple the tubular member to the retraction assembly.

7. The apparatus of claim 6, wherein the occlusion member  
10 is coupled to the retraction assembly, the elongate member further comprising a sheath extending over the proximal portion of the occlusion member, wherein the sheath may be received in the tubular member lumen when the occlusion member is inserted therein, the one or more connectors being insertable at least  
15 partially into the proximal end of the tubular member to couple the tubular member to the sheath.

8. The apparatus of claim 7, the tubular member further comprising a housing on the proximal end thereof, the housing  
20 defining a cavity, the one or more connectors comprising a detent that collapses to allow the detent to be inserted into the cavity when the sheath is received in the tubular member lumen, the

detent being biased to extend within the cavity and prevent the detent from being removed easily therefrom.

9. The apparatus of claim 8, the housing comprising one or 5 more side ports communicating with the delivery device, the sheath comprising a lumen and an opening communicating with the lumen that is disposed within the cavity when the detent is inserted into the cavity, the sheath comprising a seal distal to the opening for engaging an inner surface of the tubular member 10 to substantially seal the lumen of the tubular member, such that sealing compound delivered from the delivery device enters the one or more side ports and flows into the opening and through the lumen of the sheath.

15 10. The apparatus of claim 9, wherein a distal tip of the sheath extends beyond the distal end of the tubular member when the detent is inserted into the cavity, such that the sealing compound is delivered through the lumen of the sheath out the distal tip of the sheath and beyond the distal end of the tubular 20 member.

11. A method for sealing a puncture communicating with a body lumen using an occlusion member having an expandable member

on a distal end thereof, a tubular member, and a retraction assembly coupled to the occlusion member, the method comprising:

introducing the tubular member into the puncture;

introducing the occlusion member through the tubular member

5 into the puncture with the expandable member in a collapsed state until the expandable member is disposed within the body lumen;

coupling the tubular member to the retraction assembly;

expanding the expandable member;

at least partially withdrawing the occlusion member from the  
10 puncture until the expandable member substantially seals the puncture from the body lumen;

introducing a sealing compound through the tubular member and into the puncture until the retraction assembly is triggered, whereupon the tubular member is automatically withdrawn at least  
15 partially from the puncture, thereby delivering the sealing compound along the puncture.

12. The method of claim 11, further comprising collapsing the expandable member, and withdrawing the occlusion member from  
20 the puncture.

13. The method of claim 12, wherein the sealing compound comprises a liquid sealing compound, and wherein the occlusion

member is removed from the puncture after the sealing compound has at least partially solidify.

14. The method of claim 11, wherein the sealing compound is delivered from one or more syringes into the tubular member when a plunger assembly of the one or more syringes is depressed, the retraction assembly comprising a trigger for releasing a lock of the retraction assembly when the respective plunger assembly is depressed a predetermined distance.

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15. The method of claim 14, wherein the tubular member is coupled to the retraction assembly by connecting an elongate member extending from the retraction assembly to a proximal end of the tubular member, the elongate member being biased to move proximally when a lock of the retraction assembly is released.

16. The method of claim 15, the elongate member comprising a sheath extending over the occlusion member, wherein the step of connecting the elongate member comprises advancing the sheath 20 into the tubular member as the occlusion member is introduced through the tubular member until one or more detents on the sheath engage the tubular member.

17. A method for sealing a puncture communicating with a body lumen using an occlusion member having an expandable member on a distal end thereof, a tubular member slidably along the occlusion member, and a retraction assembly coupled to the 5 occlusion member and the tubular member, the method comprising:
- introducing an introducer sheath into the puncture;
- introducing the occlusion member into the introducer sheath with the expandable member in a collapsed state until the expandable member is disposed within the body lumen and extending 10 beyond the distal end of the tubular member;
- coupling the tubular member to the introducer sheath;
- expanding the expandable member;
- at least partially withdrawing the occlusion member from the puncture until the expandable member substantially seals the 15 puncture from the body lumen;
- introducing a sealing compound through the introducer sheath into the puncture until the retraction assembly is triggered, whereupon the tubular member is automatically withdrawn at least partially from the puncture to direct the introducer sheath 20 proximally, thereby delivering the sealing compound along the puncture.

18. The method of claim 17, wherein the occlusion member is disposed within the tubular member such that the tubular member is introduced into the introducer sheath when the occlusion member is introduced into the introducer sheath.

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19. The method of claim 17, wherein the tubular member is introduced at least partially into the introducer sheath to couple the tubular member to the introducer sheath, and wherein the occlusion member is introduced into the introducer sheath 10 through the tubular member after the tubular member is introduced into the introducer sheath.

20. The method of claim 17, wherein the tubular member is coupled to the introducer sheath by introducing the tubular member into the introducer sheath until detents on the tubular member engage a proximal end of the introducer sheath. 15